Canadian Journal of Physics

Contents
Volume 81, 2003

Revue canadienne de physique

Sommaire
Volume 81, 2003

January/February / janvier/février

10th International Conference on the Physics and Chemistry of Ice / 10e conférence internationale sur la physique et la chimie de la glace

REVIEW / SYNTHÈSE

I. Baker, D. Cullen, and D. Iliescu The microstructural location of impurities in ice 1

ARTICLES / ARTICLES

Ricardo Baltazar Ayala and Vladimir Tchijov A molecular dynamics study of ices III and V using TIP4P and TIP5P water models 11

Huang Zeng, Lee D. Wilson, Virginia K. Walker, and John A. Ripmeester The inhibition of tetrahydrofuran clathrate-hydrate formation with antifreeze protein 17

Christoph G. Salzmann, Ingrid Kohl, Thomas Loerting, Erwin Mayer, and Andreas Hallbrucker Pure ices IV and XII from high-density amorphous ice 25

Akira Hori and Takeo Hondoh Ab initio molecular-orbital calculations for dodecahedral water clusters including rare-gas atoms 33

Brent Wathen, Michael J. Kuiper, Virginia K. Walker, and Zongchao Jia Three-dimensional simulation of ice growth in the presence of antifreeze proteins 39

M.B. Helgerud, W.F. Waite, S.H. Kirby, and A. Nur Measured temperature and pressure dependence of V_p and V_s in compacted, polycrystalline sI methane and sII methane–ethane hydrate 47

Hideki Tanaka On the thermodynamic stability of clathrate hydrates 55

N. Lebrun, F. Mahe, M. Foulon, C. Gors, and J.C. Petit Thermal behaviour of nitric acid dihydrate in 1:2 HNO_3/H_2O solutions 61

Yukiko Mizuno and Tadahiko Mizuno Photon emission accompanying deformation and fracture of ice 71

M.B. Helgerud, W.F. Waite, S.H. Kirby, and A. Nur Measured temperature and pressure dependence of compressional (V_p) and shear (V_s) wave speeds in compacted, polycrystalline ice Ih 81

A.W. Rempel and J.S. Wettlaufer Segregation, transport, and interaction of climate proxies in polycrystalline ice 89

Kazushige Nagashima and Yoshinori Furukawa Effects of gravity on directional growth and melting of ice crystals in solution 99

Osamu Yamamuro, Takasuke Matsuo, Itaru Tsukushi, and Noriko Onoda-Yamamuro Inelastic neutron scattering and low-energy excitation of amorphous SF_6 hydrate prepared by vapor-deposition technique 107

A.S. Côté, I. Morrison, X. Cui, S. Jenkins, and D.K. Ross Ab-initio density-functional lattice-dynamics studies of ice 115

R.W. Whitworth Point defects and electrical properties of ice 123

Hiroyasu Shimizu High-pressure Raman and Brillouin studies of single crystalline gas hydrates 127

S. Kaasalainen, H. Karttunen, J. Piironen, J. Virtanen, A. Liljeström, and J. Näränen Backscattering from snow and ice: Laboratory and field measurements 135

Maynard J. Clouter The ice-related research of Harry Kiefte and co-workers 145

Masahiko Arakawa and Victor F. Petrenko Observation of crack propagation in saline ice and freshwater ice with fluid inclusion 159

© 2003 NRC Canada

P. Swiderek Adsorbate-induced changes in the structure of amorphous thin films of ice 167

Mary Anne White, Douglas C. MacLaren, Robert A. Marriott, and Bi-Zeng Zhan Thermodynamic stability of clathrate hydrates relative to their separate chemical components 175

B.C. Chakoumakos, C.J. Rawn, A.J. Rondinone, L.A. Stern, S. Circone, S.H. Kirby, Yoshinobu Ishii, C.Y. Jones, and B.H. Toby Temperature dependence of polyhedral cage volumes in clathrate hydrates 183

Stephen J. Jones, R.E. Gagnon, A. Derradji, and A. Bugden Compressive strength of iceberg ice 191

J.G. Dash and J.S. Wettlaufer The surface physics of ice in thunderstorms 201

Masahiko Arakawa, Victor F. Petrenko, and Cheng Chen Effect of direct- and alternating-current electric fields on friction between ice and metals 209

M.E. Palumbo and G. Strazzulla Nitrogen condensation on water ice 217

S. Jenkins, S.R. Kirk, A.S. Côté, D.K. Ross, and I. Morrison Dependence of the normal modes on the electronic structure of various phases of ice as calculated by ab initio methods 225

Iwao Takei and Norikazu Maeno Dielectric and mechanical alterations of snow properties near the melting temperature 233

N. Maeno, M. Arakawa, A. Yasutome, N. Mizukami, and S. Kanazawa Ice–ice friction measurements, and water lubrication and adhesion-shear mechanisms 241

Akira Hori and Takeo Hondoh Theoretical study on the diffusion of gases in hexagonal ice by the molecular orbital method 251

Robert Gagnon High-speed video analysis of fracture propagation in a thick-edge-loaded freshwater ice sheet 261

Laura A. Stern, Susan Circone, Stephen H. Kirby, and William B. Durham Temperature, pressure, and compositional effects on anomalous or "self" preservation of gas hydrates 271

O.B. Nasello and C.L. Di Prinzio Ice-surface properties analyzed through grain-boundary migration 285

Chris Petrich, Tim G. Haskell, and Pat J. Langhorne Structure of refrozen cracks in first-year sea ice 293

L. Schriver-Mazzuoli, A. Schriver, and H. Chaabouni Photo-oxidation of SO_2 and of SO_2 trapped in amorphous water ice studied by IR spectroscopy. Implications for Jupiter's satellite Europa 301

Lorne W. Gold Strain and temperature dependence of crack populations in columnar-grain ice 311

Sébastien Perrier, Patricia Sassin, and Florent Dominé Diffusion and solubility of HCHO in ice: preliminary results 319

Patricia L. Moore Plummer Computational studies of ice defects 325

Vlad Sadtchenko and George E. Ewing A new approach to the study of interfacial melting of ice: infrared spectroscopy 333

E.M. Chuvilin, T. Ebinuma, Y. Kamata, T. Uchida, S. Takeya, J. Nagao, and H. Narita Effects of temperature cycling on the phase transition of water in gas-saturated sediments 343

T. Uchida, S. Takeya, L.D. Wilson, C.A. Tulk, J.A. Ripmeester, J. Nagao, T. Ebinuma, and H. Narita Measurements of physical properties of gas hydrates and in situ observations of formation and decomposition processes via Raman spectroscopy and X-ray diffraction 351

T. Uchida, R. Okabe, K. Gohara, S. Mae, Y. Seo, H. Lee, S. Takeya, J. Nagao, T. Ebinuma, and H. Narita Raman spectroscopic observations of methane-hydrate formation and hydrophobic hydration around methane molecules in solution 359

I.A. Beta, A.I. Kolesnikov, I. Michalarias, G.L. Wu, R.C. Ford, and J.C. Li Incoherent inelastic neutron-scattering studies of the structure of water associated with DNA and gelatin 367

William B. Durham, Laura A. Stern, and Stephen H. Kirby Ductile flow of methane hydrate 373

A.J. Rondinone, C.Y. Jones, S.L. Marshall, B.C. Chakoumakos, C.J. Rawn, and E. Lara-Curzio A sapphire cell for high-pressure, low-temperature neutron-scattering experiments on gas hydrates 381

V.F. Petrenko and S. Peng Reduction of ice adhesion to metal by using self-assembling monolayers (SAMs) 387

© 2003 NRC Canada

D. Iliescu, I. Baker, and X. Li The effects of sulfuric acid on the creep, recrystallization, and electrical properties of ice 395

Y. Wang, A.I. Kolesnikov, S.L. Dong, and J.C. Li Neutron-scattering studies of the phase transitions in high-pressure ices during annealing 401

Y. Wang and J.C. Li Diffuse neutron-scattering studies of ice Ih under high pressures 409

J. Suzanne, D. Ferry, B. Demirdjian, C. Girardet, C. Toubin, S. Picaud, and P.N.M. Hoang The effect of HCl adsorption on the structure and dynamics of the ice surface 415

J. Suzanne, D. Ferry, O. Popovitcheva, and N.K. Shonija Ice nucleation by kerosene soot under upper tropospheric conditions 423

C.J. Rawn, A.J. Rondinone, B.C. Chakoumakos, S. Circone, L.A. Stern, S.H. Kirby, and Y. Ishii Neutron powder diffraction studies as a function of temperature of structure II hydrate formed from propane 431

Gerardo Wolfgang Gross Nitrates in ice: uptake; dielectric response by the layered capacitor method 439

Changman Moon, Paul C. Taylor, and P. Mark Rodger Clathrate nucleation and inhibition from a molecular perspective 451

Loïc Legagneux, Thomas Lauzier, Florent Dominé, Werner F. Kuhs, Till Heinrichs, and Kirsten Techmer Rate of decay of specific surface area of snow during isothermal experiments and morphological changes studied by scanning electron microscopy 459

Edwin R. Fitzgerald Dynamic mechanical measurements on fresh-water ice during freezing and thawing: preliminary results 469

S. Takeya, Y. Kamata, T. Uchida, J. Nagao, T. Ebinuma, H. Narita, A. Hori, and T. Hondoh Coexistence of structure I and II hydrates formed from a mixture of methane and ethane gases 479

H. Oyama, T. Ebinuma, W. Shimada, S. Takeya, J. Nagao, T. Uchida, and H. Narita An experimental study of gas-hydrate formation by measuring viscosity and infrared spectra 485

Hidenosuke Itoh, Bertrand Chazallon, Helmut Schober, Katsuyuki Kawamura, and Werner F. Kuhs Inelastic neutron scattering and molecular dynamics studies on low-frequency modes of clathrate hydrates 493

Alice Klapproth, Evgeny Goreshnik, Doroteya Staykova, Helmut Klein, and Werner F. Kuhs Structural studies of gas hydrates 503

A. Fortt, E.M. Schulson, and E. Russell Sliding along Coulombic shear faults in ice 519

P.K. Satyawali, N.K. Sinha, and D.N. Sethi Double-microtoming technique for snow studies 529

J.S. Loveday, R.J. Nelmes, D.D. Klug, J.S. Tse, and S. Desgreniers Structural systematics in the clathrate hydrates under pressure 539

March / mars

TUTORIAL / ARTICLE DIDACTIQUE

Paul Bracken Hamiltonian formulations of Yang–Mills theory and gauge ambiguity in quantization 545

ARTICLES / ARTICLES

D.D. Betts, K.S. Lee, and H.Q. Lin Exact diagonalization of the $S = 1/2$ XY ferromagnet on a new set of finite triangular lattices at $T = 0$ 555

Mark R.A. Shegelski and Erik V. Kozijn Quantum mechanical versus quasi-classical tunneling times for smooth potential barriers 573

C.J. Walsby, N.S. Lees, R.F.C. Claridge, and J.A. Weil The magnetic properties of oxygen-hole aluminum centres in crystalline SiO_2. VI: A stable AlO_4/Li centre 583

J.M. Forniés-Marquina, J.C. Martín, J.P. Martínez, J.L. Miranda, and C. Romero Dielectric characterization of coals 599

Joaquín Cortés and Eliana Valencia Time scaling in the reorganization of adsorbed species in surface reactions 611

F.M. Amanullah Effect of isochronal annealing on CdTe and the study of electrical properties of Au–CdTe Schottky devices 617

© 2003 NRC Canada

April / avril

G. Spirou, I. Yavin, M. Weel, A. Vorozcovs, A. Kumarakrishnan, P.R. Battle, and R.C. Swanson A high-speed-modulated retro-reflector for lasers using an acousto-optic modulator 625

T. Mikaelian, M. Weel, A. Kumarakrishnan, P.R. Battle, and R.C. Swanson A high-speed retro-reflector for free-space communication based on electro-optic phase modulation 639

I. Yavin, T. Mikaelian, and A. Kumarakrishnan Calculation of the transfer efficiency between dual magneto-optical traps and simulation of a Ioffe trap for Bose–Einstein condensation 651

A.O. Bolivar Dynamical quantization and classical limit 663

H.H. Sherief, M.S. Faltas, and E.I. Saad Forced gravity waves in two-layered fluids with the upper fluid having a free surface 675

M. Saad L (X-ray) cross sections of heavy elements excited by 15.20 keV photons 691

E.M.A. Elbashbeshy and M.A.A. Bazid Heat transfer over a stretching surface with internal heat generation 699

Samira T. Bishay, Osama M. Abo-Seida, and Ghada M. Sami Natural-frequency concept utilized in remote probing of the earth 705

May / mai

TUTORIAL / ARTICLE DIDACTIQUE

A.F. Antippa Unification of Newton's laws of motion 713

ARTICLES / ARTICLES

I. Elloumi Apport de la collimation assistée par ordinateur à l'amélioration de la qualité de l'image en tomographie d'émission monophotonique 737

A.A. Kamenski and V.D. Ovsiannikov Analytical formulas for the Stark effect on intensity of hydrogen radiation lines 755

A.-K. Hamid and M.I. Hussein Electromagnetic scattering by a lossy dielectric-coated elliptic cylinder 771

Mohamed I.A. Othman and Sayed A. Zaki The effect of thermal relaxation time on a electrohydrodynamic viscoelastic fluid layer heated from below 779

Hazem Ali Attia Unsteady flow of a dusty conducting non-Newtonian fluid through a pipe 789

June / juin

G. Quirion, A. Kelly, S. Newbury, F.S. Razavi, and J.D. Garrett Investigation of the elastic properties of UNi_2Si_2 as a function of temperature, magnetic field, and pressure 797

Abdel Raouf F. Elhefnawy, Galal M. Moatimid, and Abd Elmonem Khalil Elcoot The effect of an axial electric field on the nonlinear stability between two uniform stream flows of finitely conducting cylinders 805

Magdy A. Ezzat and Ahmed S. El-Karamany On uniqueness and reciprocity theorems for generalized thermo-viscoelasticity with thermal relaxation 823

Asiri Nanayakkara and Chula Abayaratne Identification of semiclassical chaos in two-dimensional *PT*-symmetric systems 835

Hitesh Sharma and S. Prakash Strain field due to transition-metal impurities in Fe 847

Narendra Singh, Avnindra K. Singh, and Man Mohan Level energies and oscillator strengths in Ni(XII) 861

Osama M. Abo-Seida and Ghada M. Sami Transient fields of a vertical electric dipole on an *M*-layered dielectric medium 869

DISCUSSIONS / DISCUSSIONS

Mark Denny Comment on "The motion of a curling rock" 877

Mark R.A. Shegelski and Ross Niebergall Reply to the comment by M. Denny on "The motion of a curling rock" 883

© 2003 NRC Canada

Andreas Aste Comment on "A simple explanation of the nonappearance of physical gluons and quarks" 889

Johan Hansson Reply to the comment by A. Aste on "A simple explanation of the nonappearance of physical gluons and quarks" 893

July / juillet

J.R. Mureika Modeling wind and altitude effects in the 200 m sprint 895

S.B. Utter, P. Beiersdorfer, and E. Träbert Accurate wavelengths of resonance lines in Zn-like heavy ions 911

R.I. Campeanu, L. Nagy, and A.D. Stauffer Near-threshold ionization of atoms and molecules by positron impact 919

James D. Bonnar and Jeffrey R. Schmidt Classical orbits from the wave function in the large-quantum-number limit 929

E. Träbert , G. Gwinner, E.J. Knystautas, and A. Wolf Heavy-ion storage-ring quest for atomic lifetimes in Li^+ and Be^{2+} 941

S.I. Kruglov Exact solutions of the equation for composite scalar particles in quantized electromagnetic waves 953

A.O. Bolivar The Bohm quantum potential and the classical limit of quantum mechanics 971

August / août

Paul Bracken Factorization of second-order matrix differential operators and a matrix Darboux transformation 977

J.L.V. Lewandowski Numerical loading of a Maxwellian probability distribution function 989

F.T. Brandt and D.G.C. McKeon The vacuum polarization in two-dimensional noncommutative QED 997

D.G.C. McKeon Dimensional reduction of the spinning string in a background gravitational field 1005

F.E. Irons New method for reducing the general formula for lattice specific heat to the Einstein and Nernst–Lindemann approximations 1015

M. Hosseini Farzad and M.T. Tavassoly Semiclassical behavior of the degenerate four-wave mixing without slowly varying amplitude approximation 1037

P.H. Butler, W.P. Joyce, L.F. McAven, and B.G. Searle Recursive calculation of nonprimitive coupling and recoupling brakets 1051

September / septembre

Vlado Spiridonov and Mladjen Curic A three-dimensional numerical simulation of sulfate transport and redistribution 1067

Zacharie Koalaga Composition d'équilibre des plasmas de H_2, O_2 et N_2 hors équilibre thermique 1095

Abdelaziz Zouari and Adel Ben Arab A simple formulation of the saturation current density in heavily doped emitters 1109

Pirooz Mohazzabi and Lasitha Cumaranatunge Graham's law of effusion in dense systems with nonuniform interactions 1121

F.L. Ridener, Jr. and E.T. Dressler Detecting resonant states in $\gamma d \rightarrow \pi^0 d$ 1131

Tarek M.A. El-Mistikawy and Hazem Ali Attia Magnetohydrodynamic flow near the edge of a rotating disk 1141

October / octobre

Alberto Castro, Angel Rubio, and M.J. Stott Solution of Poisson's equation for finite systems using plane-wave methods 1151

Dan Solomon Some remarks on Dirac's hole theory versus quantum field theory 1165

Ghada El-Machtoub Contributions of high-*n* dielectronic satellites to krypton K-shell emission spectra 1177

© 2003 NRC Canada

Jian-Qi Shen, Pan Chen, and Hong Mao Exact time-dependent decoherence factor and its adiabatic classical limit 1185
T. Hayat, S. Asghar, and K. Hutter Scattering from a slit in a biisotropic medium 1193
F.M. Toyama and Y. Nogami Transmission and reflection of a wave packet with a small width in one-dimensional quantum mechanics 1205
Essaid Zerrad, Al-Sameen Khan, Kamal Zerrad, and George Rawitscher Singular-value decomposition method in atomic scattering 1215
Hazem Ali Attia Homann magnetic flow and heat transfer with uniform suction or injection 1223

November / novembre

D.G.C. McKeon Superspace models for S_3 1231
J. Fukai and A.K.T. Assis Testing Mach's principle in electrodynamics 1239
Y.P. Varshni Wave functions for the hydrogen atom in a dense plasma 1243
Nabil T.M. Eldabe, Galal M. Moatimid, and Hoda S.M. Ali Magnetohydrodynamic flow of non-Newtonian visco-elastic fluid through a porous medium near an accelerated plate 1249
N.N. Abd Allah Pseudorapidity distribution of shower particles in relativistic nucleus–nucleus collisions 1271
G.R.P. Borges, A. de Souza Dutra, Elso Drigo, and J.R. Ruggiero Variational method for excited states from supersymmetric techniques 1283
S. Abdesselem, A. Ouhab et M.S. Aida Influence de la température de substrat sur la croissance et les propriétés des films minces de silicium amorphe déposés par pulvérisation cathodique 1293
F. Öner and N.T. Okumuşoğlu Calculation of the radiation doses occurring in the human body for inadvertent ingestion of soil and other soil exposure pathways 1303

December / décembre

J.L.V. Lewandowski Collisional drift waves in stellarator plasmas 1309
J.L.V. Lewandowski Strange attractors in drift wave turbulence 1331
M.P. Gagné-Portelance and D.G.C. McKeon One-loop divergences in anomaly-free non-Abelian axial models 1343
D.G.C. McKeon Supersymmetry in five-dimensional spaces of constant curvature 1349
M.H. Dehghani and H. KhajehAzad The thermodynamics of a Kerr–Newman–de Sitter black hole 1363
Marian Lazar and Reinhard Schlickeiser Relativistic kinetic theory of electromagnetic waves in equilibrium magnetized plasma. General dispersion equations 1377
D. Masterman, S.D. Rosner, T.J. Scholl, A. Sharikova, R.A. Holt Isotope shifts and hyperfine structure in Sm II 1389
Mohamed I.A. Othman State-space approach to generalized thermoelasticity plane waves with two relaxation times under dependence of the modulus of elasticity on reference temperature 1403
Xiao-Li Wu, Bing-Cong Gou, and Fei Wang Energy, fine structure, and transition rate of the doubly excited $^3P^e$ and $^3D^e$ states for helium 1419
Arvind K. Gathania and K.K. Raina Field-induced effects in an eutectic nematic liquid crystal mixture 1427
A. Aste and D. Trautmann Finite calculation of divergent self-energy diagrams 1433
Author Index / Index des auteurs AI-1
Subject Classificaton / Classification thématique SC-1
Contents / Sommaire C-1

© 2003 NRC Canada